

flower of Texas. However, not many Texans ever have seen *Lupinus Havardi*. Is not this species the most magnificent lupine of the United States? Mr. Beath photographed this particular plant.

TEXAS AGRICULTURAL EXPERIMENT STATION
Agricultural and Mechanical College of Texas.

LAST SURVIVORS IN THE FLORA OF TIDEWATER VIRGINIA

M. L. FERNALD

(Continued from p. 559)

VERONICA ANAGALLIS-AQUATICA, forma ANAGALLIFORMIS (Boreau) G. Beck (*V. glandifera* Pennell). Spring-heads, ditches and pools, various stations in JAMES CITY, SURRY and NANSEMOND COUNTIES (many nos.). PLATES 580 and 581.

I have studied for many days the series of circumboreal material of *Veronica Anagallis-aquatica*, vainly striving to find the two endemic American species, *V. glandifera* Pennell in Torrey, xix. 170 (1919) and *V. connata* Raf. Med. Fl. ii. 110 (1830) or *V. catenata* Pennell in RHODORA, xxiii. 37 (1921), maintained by Pennell. It seems to me that many specimens of American *V. glandifera* (PL. 580, FIGS. 1, 3 and 5; PL. 581, FIGS. 1, 4 and 6) are quite inseparable from the plants of European *V. Anagallis-aquatica* (or *V. Anagallis* of most European authors) with a few glandular hairs in the inflorescence (PL. 580, FIGS. 2, 4 and 6; PL. 581, FIGS. 2 and 5); and certainly, if the few glands are discounted, it is to me quite impossible to separate material from the type-region (vicinity of Suffolk, Virginia, PL. 581, FIG. 6) from a large series of typical European and Asiatic *V. Anagallis-aquatica*. The differences between *V. Anagallis-aquatica* and *V. glandifera* given by Pennell are as follows:

- “E. Stems distally, rachis, and pedicels glabrous or nearly so; sepals acute to slightly acuminate; style 1.5–3 mm. long; leaf-blades oblong-ovate, mostly widest about the middle, slightly serrate to nearly entire. 17. *V. anagallis-aquatica*.
EE. Stems distally, rachis, and pedicels pubescent with gland-tipped hairs; sepals strongly acuminate; style 1–1.5 mm. long; leaf-blades lanceolate or broadly lanceolate, widest near the base, usually more strongly serrate. 18. *V. glandifera*.”

In Europe, however, *Veronica Anagallis-aquatica* (or *V. Anagallis*)



Photo. W. H. Hodge

VERONICA ANAGALLIS-AQUATICA, forma ANAGALLIFORMIS (*V. glandifera*): FIG. 1, branch, $\times 1$, from Virginia; FIG. 2, young branch, $\times 1$, from Ireland; FIG. 3, fruits, $\times 8$, from Virginia; FIG. 4, fruits, $\times 8$, from Ireland; FIG. 5, fruit, $\times 8$, from Virginia; FIG. 6, fruit, $\times 8$, from Switzerland.



Photo. W. H. Hodge

VERONICA ANAGALLIS-AQUATICA: FIG. 3, fruit, $\times 8$, from Italy.

FORMA ANAGALLIFORMIS (*V. glandifera*): FIG. 1, branch, $\times 1$, from Virginia; FIG. 2, young branch, $\times 1$, from Sweden; FIG. 4, fruit, $\times 8$, from Virginia; FIG. 5, fruit, $\times 8$, from Sweden; FIG. 6, fruit, $\times 8$, from type-locality of *V. glandifera*, near Suffolk, Virginia.

is well known to have a variation of leaf-outline from oblong-ovate to lanceolate: "Folia oblongo-ovata vel lanceolata, acuta denticulata vel subintegerrima"—Hayek in Fedde, *Repert. Beih.* xxx². 173 (1929); "Blätter . . . lanzettlich bis länglich, . . . gezähnt"—Römpf in Fedde, *Repert. Beih.* l. 159 (1928). In fact, the European students of *Veronica* consider the presence of glands in the inflorescence of no great taxonomic significance: "Kommt hin und wieder auch mit drüsenhaariger Traube vor = f. *anagalliformis* [Boreau *Fl. du centr. de la France* ed. 3, II 489]"—G. Beck, *Fl. Nied.-Österr.* ii. 1051 (1903); "Am meisten variabel ist die B e h a a r u n g . Auser den kahlen kommen in manchen Gegenden glandulöse Formen vor, die kahlstengelig, aber innerhalb der Infloreszenz ± drüsig sind: f. *anagalliformis* (Boreau . . .) Beck."—Schuster, *Unsere Wasserehrenpreise* in *Mitteil. Bayer. Bot. Gesells.* i. 537, 538 (1906).

Pennell feels that true *Veronica Anagallis-aquatica* with glabrous inflorescences is only "Naturalized from Eurasia"¹ in its broad North American range, because the earliest collection was made in 1883; but the form with some glands in the inflorescence (his *V. glandifera*) he considers an endemic and indigenous species of the eastern United States: "This was collected by Clayton in Virginia before 1739 . . . ; such an early date confirms the distributional evidence that *V. glandifera* is an indigenous species."² Only 17 pages before we are told by him of *V. arvensis*, which may occur "on cliffs and in open woods," that for it "Linnaeus cited other works back to . . . 1623, and among these were Gronovius and Colden; the latter showed the plant's early introduction to New York, and the former (Gronov., *Fl. Virg.* 4. 1739), based upon Clayton's number 369 . . . shows similar early introduction to Virginia." In the type-region, near Suffolk, Virginia, the glandular American form of *V. Anagallis-aquatica* (i. e. *V. glandifera*) occurs in ditches by the railroad; at its Surry County stations it is in the man-made wells at springheads on old plantations or in rills with European Water Cress and the introduced *Potamogeton crispus*; near Williamsburg it fills an artificially dammed stream or small pond, along with such obviously introduced species as the cultivated South American *Myriophyllum brasiliense* (*M. proserpinacoides*) and the European and generally cultivated Water Cress.

¹ Pennell, *Scroph. E. Temp. N. A.* (*Acad. Sci. Nat. Phil. Mem.* i.), 363 (1935).

² Pennell, l. c. 364 (1935).

The second species, similar to *Veronica Anagallis-aquatica* in having sessile cauline leaves, is the plant (PL. 582 and 583) which differs from it in having fewer (5-35)-flowered racemes with more loosely and horizontally divergent pedicels; the smaller corolla roseate to white (instead of larger and bluish-lilac); the round-reniform or broadly obcordate deeply notched capsules mostly longer than the blunt or merely acutish lance-oblong or narrowly ovate sepals. This, like *V. Anagallis-aquatica*, may be either glabrous throughout or more or less glandular at summit or in the inflorescence. It has been treated by Pennell as an endemic North American species, ranging across the continent, from New England and southern Quebec to the Pacific, and southward to southern Pennsylvania, Tennessee, Missouri, Oklahoma, New Mexico, Arizona and southern California. The glabrous form mostly western, the glandular one mostly eastern. The glabrous plant is *V. catenata* Pennell in RHODORA, xxiii. 37 (1921); the glandular one *V. catenata glandulosa* (Farwell) Pennell, l. c. (1921), based on *V. Anagallis-aquatica*, var. *glandulosa* Farwell in Rep. Mich. Acad. Sci. xix. 249 (1917). In his later study¹ Pennell takes up for the American series which he had called *V. catenata* the very incorrectly or erroneously described and wholly doubtful *V. connata* Raf. Med. Fl. ii. 110 (1830), which was said by its author to be close to *V. scutellata*, and which was assigned perfoliate and entire leaves such as are not found in our plant. Pennell recognized that Rafinesque's account lacked absolute clarity, but he felt "that we must replace the name of *V. catenata* by *V. connata*; it is regretfully that I do so because the latter name is actually, though not obviously, a misnomer."

It seems to me from close comparison of specimens that there is no need to take up for the plant under consideration the very doubtful *V. connata* Raf.; neither is *V. catenata* Pennell required for it. I am quite incapable of separating the American series (PL. 582, FIG. 1; PL. 583, FIGS. 1 and 3) from the Eurasian series (PL. 582, FIG. 2; PL. 583, FIGS. 2 and 4) which is there regularly passing as *V. aquatica* Bernh. Über Beg. Pflanzen. Art. 66 (1834). Since arriving at this conclusion after several days of close comparison I find that the same decision was earlier reached by Römpp in his study of the world-wide genus *Veronica*, "Die Verwandtschafts-verhältnisse in der Gattung *Veronica*," in Fedde, Repert. Beih. I. (1928). Here are Römpp's words: "Soviel sich der Originaldiagnose entnehmen lässt, scheint *V. catenata* Pennell

¹ Pennell, Scroph. E. Temp. N. Am. (Acad. Nat. Sci. Phil. Mon. i.), 364-370 (1935).

mit *V. aquatica* Bernh. identisch zu sein . . . *V. catenata glandulosa* (Farwell) Pennell würde, falls sich die oben angedeutete Vermutung beim Vergleich von Originalmaterial bestätigen lassen sollte, der drüsigen Varietät *V. Anagallis* (= *V. aquatica*) var. *glandulosa* Čelak. der alten Welt entsprechen." (pp. 162, 163). Pennell, l. c. 329, refers to Römpp's "comprehensive paper on relationships in the Genus *Veronica*"; but he still maintains the American material as an endemic species.

Unfortunately, the name *Veronica aquatica* Bernh. (1834), the name used by Römpp, by Hayek, by Beck von Mannagetta and, apparently, by all modern European botanists, is a later homonym and, therefore, cannot be held. It is antedated by *V. aquatica* S. F. Gray, Nat. Arr. Brit. Pl. ii. 306 (1821). The latter name is illegitimate because an absolute substitute for *V. Anagallis-aquatica* L. (1753); but, since those who felt (and still feel) that illegitimate names should have no power to invalidate later legitimate but identical names, were overruled at Cambridge in 1930; and since the International Rules (Art. 61) state that: "Even if the earlier homonym is illegitimate . . . the later homonym must be rejected," it is obvious that *V. aquatica* Bernh. cannot be maintained. Römpp cites several binomials under it. The earliest of these is *V. tenerrima* F. W. Schmidt in Mayer, Sammlg. Phys. Aufs. i. 198 (1791), a very questionable plant, which has been referred in each case with seeming finality to all three species, *V. Beccabunga* L., *V. Anagallis-aquatica* L. and *V. aquatica*! Schuster's discussion of it is to the point:

Zu *aquatica* gehört nach Originalen auch *V. anagallis* var. *anagaloides* C. Koch teste Trautvetter (Herb. horti Petropolitani). Eine schwankende Stellung in der Literatur nimmt *V. tenerrima* Schmidt *Fl. boëm. 1793, I, 14* ein. Reichenbach (1862) wusste mit ihr nichts anzufangen. Beck (1893) stellte sie zu *V. beccabunga*, Ascherson (1898) zu der Landform von *V. anagallis*. Nach einem Originalexemplar (Comm. Kitaibel HRM) ist die Pflanze Schmidts eine in allen Teilen kleinere, oft wenigblütige, ca. 20 cm hohe Varietät von *V. aquatica*. Auf der Originaletikette bemerkt Schmidt: „An varietas sit *Anagallidis*, adhuc dubito, donec cultura decidat." Da sie Schmidt 1793 in seiner *Flora boëmica* als Art aufnahm, scheint sie sich samenbeständig gehalten zu haben. Wegen der ganzrandigen teilweise kurz gestielten unteren Blätter hielt sie Beck vermutlich für eine Form von *beccabunga*, aber alle Merkmale, namentlich auch der vierkantige Stengel, sprechen für *aquatica*.¹

From this account the undesirability of taking up for the circum-

¹ Schuster in *Mitteil. Bayer. Bot. Gesells. i. 538* (1906).

boreal *Veronica aquatica* the very doubtful *V. tenerrima* is apparent. Very similarly, *V. acutifolia* Gilib. Exercit. i. 119 (1792) is taken up unequivocally by Jávorka, Magyar Fl. 996 (1895) in place of *V. aquatica* Bernh., but Römpp as unequivocally puts it into the synonymy of *V. Anagallis-aquatica*! Its exact identity now becomes very important to make out. Passing *V. connata* Raf., which is surely very doubtful and with no authentic material known, we come to *V. salina* Schur, Enum. Pl. Transsylv. 492 (1866), with "Caule erecto, 2 ped. et altior. . . . Foliis anguste lanceolatis, . . . amplexicaulibus, . . . margine glanduloso-serrato-dentatis. Floribus minimis . . . Rachi, pedunculis calycibusque parce glanduloso-pilosis. Corollis rubellis calycem aequantibus. Calycis laciniis . . . oblongis obtusiusculis." This is a good account of *V. aquatica* Bernh.; and Schuster, as well as Römpp, placed *V. salina* in the unquestioned synonymy of *V. aquatica*. So far as I can make out the earliest clear and valid name for *V. aquatica* Bernh. (later homonym) is *V. salina* Schur. There are doubtless those who will champion the very vague *V. tenerrima* and the untypified and inaccurately described *V. connata* as against the clearly described and well understood *V. salina*. Personally I prefer a basis of some security rather than one of perpetual insecurity. Until it is shown that I am in error (and this note will call forward corrections if they are needed) I am taking up *V. SALINA* Schur for the illegitimate *V. aquatica* Bernh.

Typical *Veronica salina* was the form with more or less glandular inflorescence. It includes the following named forms:

V. SALINA Schur, Enum. Pl. Transsylv. 492 (1866). *V. Anagallis*, var. *glandulifera* Čelak. in Oest. Bot. Zeitschr. xxvii. 165 (1877). *V. aquatica*, forma *glandulifera* (Čelak.) G. Beck, Fl. Nied.-Österr. ii. 1051 (1893). *V. Anagallis-aquatica*, var. *glandulosa* Farwell in Rep. Mich. Acad. Sci. xix. 249 (1917). *V. catenata glandulosa* (Farwell) Pennell in RHODORA, xxiii. 37 (1921). *V. connata typica* sensu Pennell, Acad. Nat. Sci. Phila. Mon. i. 365 (1935), perhaps not *V. connata* Raf. (1830) which was described as glabrous and with perfoliate and entire leaves.

The wholly glabrous form is

V. SALINA Schur, forma **laevipes** (G. Beck), comb. nov. *V. aquatica* Bernh. Über Beg. Pflanzen Art. 66 (1834), not S. F. Gray (1821). *V. aquatica*, forma *laevipes* G. Beck., Fl. Nied.-Österr. 1051 (1893). *V. catenata* Pennell in RHODORA, xxiii. 37 (1921). *V. connata glaberrima* Pennell, Acad. Nat. Sci. Phila. Mem. i. 368 (1935).

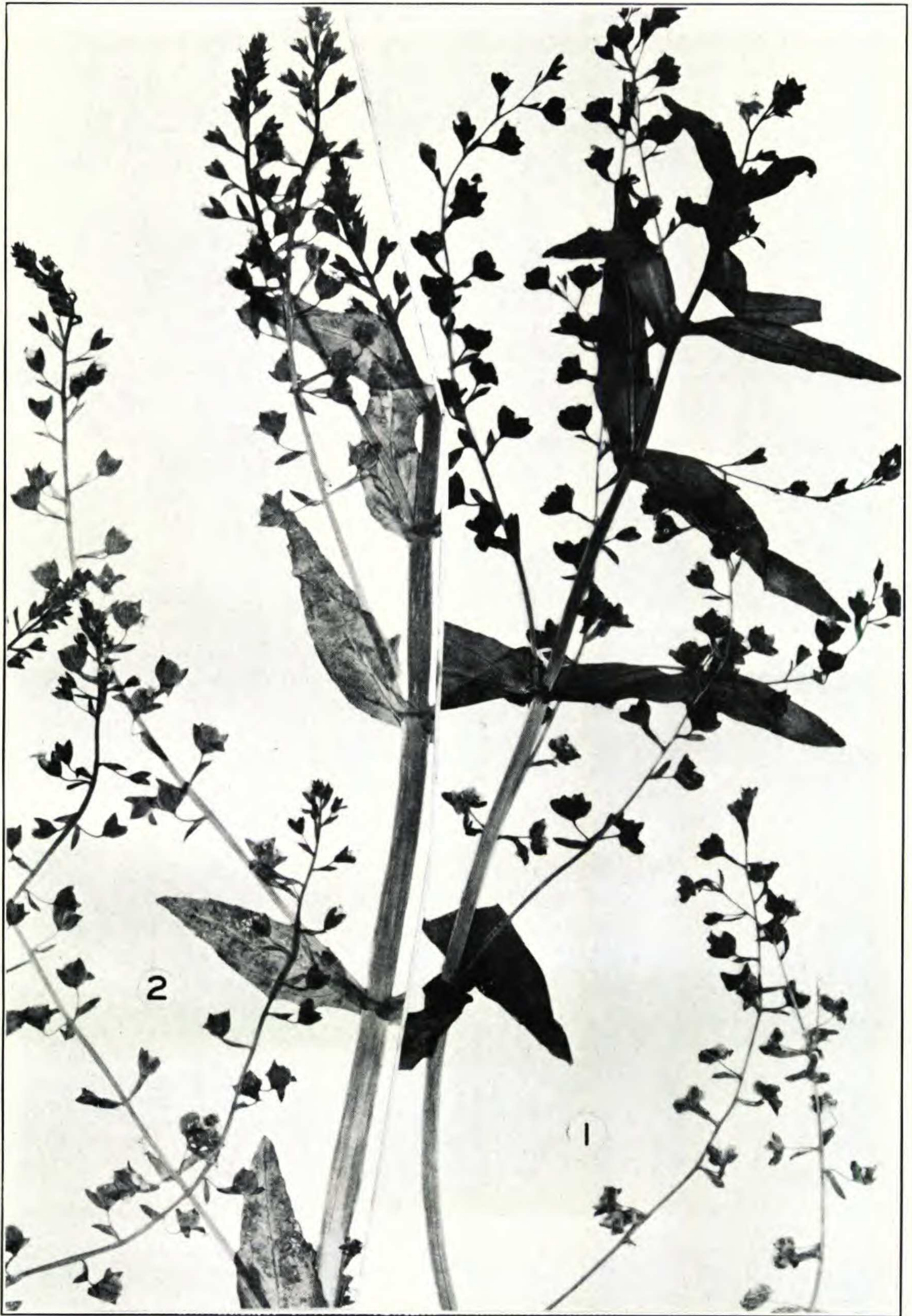


Photo. W. H. Hodge

VERONICA SALINA, forma LAEVIPES (*V. catenata*): FIG. 1, branch, $\times 1$, from California; FIG. 2, branch, $\times 1$, from Bavaria.



Photo. W. H. Hodge

VERONICA SALINA (*V. catenata*, subsp. *glandulosa*) and forma LAEVIPES (*V. catenata*): FIG. 1, branch of slightly glandular plant, $\times 1$, from Indiana; FIG. 2, branch, $\times 1$, from Austria; FIG. 3, fruit, $\times 8$, from South Dakota; FIG. 4, fruit, $\times 8$, from Austria.

EXPLANATION OF PLATES 580-583.

PLATE 580. *VERONICA ANAGALLIS-AQUATICA* L., forma *ANAGALLIFORMIS* (Boreau) G. Beck (*V. glandifera* Pennell): FIG. 1, branch, $\times 1$, of *V. glandifera* (det. Pennell) from near Williamsburg, Virginia, Grimes, no. 4587; FIG. 2, young branch, $\times 1$, from Stradbally, Queens County, Ireland, John Ball; FIG. 3, fruit, $\times 8$, of *V. glandifera* from near Williamsburg, Virginia, Fernald & Long, no. 8847; FIG. 4, fruit, $\times 8$, from Newbridge Mt. Bellew, Galway, Ireland, July 17, 1906, Bowers; FIG. 5, fruit, $\times 8$, from *V. glandifera* (det. Pennell), from Round Top Mountain, Smyth Co., Virginia, alt. 3000 ft., July 2, 1892, J. K. Small; FIG. 6, fruit, $\times 8$, from entre Marin et Thielle, Switzerland, Godet.

PLATE 581. *VERONICA ANAGALLIS-AQUATICA* L.: FIG. 3, fruit, $\times 8$, from fossis propre pagum Fratta, Venetia, Pampanini in Fl. Ital. Exsicc., no. 149; *V. ANAGALLIS-AQUATICA*, forma *ANAGALLIFORMIS* (Boreau) G. Beck: FIG. 1, branch of *V. glandifera* from Eastover, Virginia, Fernald & Long, no. 8845; FIG. 2, tip of branch from Gotland, Sweden, July 25, 1924, T. M. Fries; FIG. 4, fruit, $\times 8$, of *V. glandifera* from Round Top Mt., Smyth Co., Virginia, July 2, 1892, J. K. Small; FIG. 5, fruit, $\times 8$, from Sweden (same specimen as FIG. 2); FIG. 6, fruit, $\times 8$, of *V. glandifera*, from type-locality, near Suffolk, Virginia, Fernald & Long, no. 8846.

PLATE 582. *VERONICA SALINA* Schur, forma *LAEVIPES* (G. Beck) Fernald (*V. aquatica* Bernh., forma *laevipes* G. Beck; *V. catenata* Pennell): FIG. 1, branch, $\times 1$, of *V. catenata* (det. Pennell), from Alviso, Santa Clara County, California, C. F. Baker, no. 1700; FIG. 2, branch, $\times 1$, of *V. salina*, forma *laevipes* from Bavaria, Fl. Exsicc. Bav. no. 460.

PLATE 583. *VERONICA SALINA* (*V. catenata*, subsp. *glandulosa* (Farw.) Pennell) and forma *LAEVIPES* (*V. catenata* Pennell): FIG. 1, branch, $\times 1$, of *V. catenata* subsp. *glandulosa* (det. Pennell) from Starke County, Indiana, Deam, no. 42,185; FIG. 2, branch, $\times 1$, of *V. aquatica* Bernh. (not S. F. Gray) from Lower Austria, Braun & Rechinger in Fl. Exsicc. Austr.-Hung., no. 2620; FIG. 3, fruit, $\times 8$, from Hot Springs, Fall River County, South Dakota, E. J. Palmer, no. 37,432; FIG. 4, fruit, $\times 8$, of *V. aquatica* from same specimen as FIG. 2.

VERONICA DIDYMA Ten. PRINCE GEORGE COUNTY: weed in old yard by James River, City Point, no. 9779.

VERONICASTRUM VIRGINICUM (L.) Farwell. SUSSEX COUNTY: border of moist woods south of Stony Creek, no. 9142. GREENSVILLE COUNTY: rich deciduous woods by Metcalf Branch, east of Emporia, no. 9143.

Pennell, l. c., map 86, indicates no Atlantic Coastal Plain stations from south of New Jersey.

SEYMERIA CASSIOIDES (Walt.) Blake. To the original Virginian stations (in Isle of Wight and Greensville Counties) add others in SUSSEX and NANSEMOND COUNTIES (several nos.). See p. 485.

BUCHNERA AMERICANA L. To the single Coastal Plain Virginian station (in Prince George County) reported in 1937 add others in DINWIDDIE and GREENSVILLE COUNTIES (several nos.). See p. 469.

UTRICULARIA JUNCEA Vahl. GREENSVILLE COUNTY: shallow rill in sphagnous bog about 1 mile northeast of Dahlia, nos. 9149 and 9629.

Beautiful material, up to 5 dm. high. See pp. 472, 485.

U. VIRGATULA Barnhart. GREENSVILLE COUNTY: with the last, nos. 9435 and 9628. See MAP 12 and p. 485.

Much later and decidedly lower (0.7–2 dm. high) than the larger-flowered *U. juncea*, with which it grows.

RUELLIA STREPENS L. PRINCE GEORGE COUNTY: swampy woods, bottomland of Powell's Creek, Garsyville, nos. 8472, 8854. CHARLES CITY COUNTY: alluvial woods along James River, Harrison Point, no. 9150.

Our only Coastal Plain stations; but it was found by Grimes in James City County.

**DICLIPTERA BRACHIATA* (Pursh) Spreng. SOUTHAMPTON COUNTY: wooded alluvial bottomland of Meherrin River, near Haley's Bridge, nos. 8474, 9437 and 9438.

A slight extension northward, Pursh's type having come from the Roanoke River in North Carolina. See p. 486.

**PLANTAGO INDICA* L. (*P. arenaria* Waldst. & Kit.). CAROLINE COUNTY: railroad gravel southeast of Guinea, no. 9153. See p. 474.

**SHERARDIA ARVENSIS* L. DINWIDDIE COUNTY: shaded argillaceous grassland south of Burgess Station, no. 10,030.

HOUSTONIA LONGIFOLIA Gaertn. Reaching the Coastal Plain in SURRY COUNTY: rich calcareous wooded gullies along James River, Eastover, no. 8859. SOUTHAMPTON COUNTY: rich mixed and deciduous woods near Nottoway River, above Carey Bridge, no. 10,432. See p. 466.

OLDENLANDIA BOSCHII (DC.) Chapm. CHESTERFIELD COUNTY: margin of exsiccated old mill-pond in Swift Creek, Lakeview, no. 9439. See p. 477.

VIBURNUM AFFINE Bush, var. *HYPOMALACUM* Blake. AMELIA COUNTY: border of woods west of Ammon, no. 9155. See p. 474.

SPECULARIA BIFLORA (R. & P.) Fisch. & Meyer. Characteristic of fallow fields and roadsides. DINWIDDIE COUNTY: east of Burgess Station, no. 10,041; near Burgess Station, no. 10,042. SOUTHAMPTON COUNTY: Franklin, no. 10,044. GREENSVILLE COUNTY: north of Skipper's, no. 10,043. See p. 496.

CAMPANULA AMERICANA L. Rich calcareous wooded slopes, ravines and thickets along the James, SURRY COUNTY: Claremont Wharf, no. 9158; Sunken Meadow Beach, no. 9159; Eastover, no. 8860. See pp. 466, 475.

LOBELIA SIPHILITICA L. SURRY COUNTY: wet ditch at border of woods west of Claremont, no. 9160; along rills, slopes of gullies in rich beech woods 1½ miles north of Surry, no. 9444; damp rich deciduous woods 1½ miles east of Blizzard's Corners, no. 9445. See p. 475.

LOBELIA PUBERULA* Michx., forma **candida, f. nov., corollis albidis.—VIRGINIA: wooded swamp about 2 miles southeast of Cleopus,